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MUNICIPAL SOLID WASTE CHARACTERIZATION AND QUANTIFICATION AS A MEASURE OF EFFECTIVE MANAGEMENT: FIRST CASE STUDY FROM THE AREA

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ABSTRACT

The Municipal Solid Waste (MSW) generated from different activities in the township and city areas are a subject of deep concern for its proper management. The improper management of the MSW is a major cause for water, air and soil pollution. Despite some progress, municipal solid waste (MSW) still remains one of the major challenges in environmental management. The results shows that the composition of the waste generated in study area is dominated by food wastes, grasses and leaves(91.69%) followed by plastic and wood(8.31%). The analysis also indicated that solid waste management capacity of the study area was under stress due to different reasons. Currently, the overall technical arrangement right from collection including transport, storage, discharge and disposal is still in poor condition, which leads to environmental and health risks. Finally, it is recommended that these problems should be solved in an integrated manner by improving legislation, environmental education and solid waste management facilities so as to reduce the risk on environmental and public health. The study carried out was first of its kind in the area.

KEYWORDS: *Solid Waste, Characterization, Generation Rate, Disposal, Solid Waste Management*

INTRODUCTION

Solid waste refers to unwanted or useless solid materials generated from combined residential, industrial and commercial activities in a given region (Parvathamma, 2014). It is classified as domestic, industrial, commercial, construction or institutional and on content basis as organic material, glass, metal, plastic and according to hazard potential toxic, non-toxin, flammable, radioactive, infectious etc. (Festus and Omoboye, 2015). Ecologically, solid waste can be categorized into as biodegradable, non-biodegradable and inert waste (Kumar and Singh, 2013).Due to the fast economic development and urbanization, the generation of municipal solid waste (MSW) has rapidly increased worldwide and the composition of MSW has also changed significantly. These changes bring more pressure on the existing environment, human health and also to the management of MSW system (Wang and Nie, 2001; Zhao *et al*. 2011). Generally, increased population growth and rising consumer choices have resulted in a larger production of waste worldwide (Karak*et al*, 2012). The sources of MSW are primarily classified in to residential, institutional and commercial waste (Yousuf and Rehman, 2008; Kalanatarifard *et al*, 2012). Hence, an attempt was made to study the generation and composition of MSW from commercial area of Janipur, Jammu. This study will help us to place before the management the problems arising out of solid waste applicable not only to the study area but to other areas as well.

MATERIALS AND METHODS

- The study area is located in the north of Jammu city within the municipal limits. The area is comprised of approximately 750 shops. During sampling different types of waste like biodegradable, non-biodegradable and the total waste generation were weighed separately with the help of spring balance and digital balance.Data of solid waste generation of three samples from each shop was compiled to calculate average solid waste(kg/day) generation. On an average 20 shops were selected at each site for sampling. This average value was multiplied by total number of shops to calculate Average Solid Waste(kg/day) generation in various study sites in the commercial area.
- Total SolidWaste (Kg/day) =Average Solid Waste (kg/day) × Total No. of Shops.
- Finally, data was compiled to calculate total average solid waste Kg/month at different study sites.

OBSERVATION

The study area was divided into three study sites and the critical observation revealed that the area was comprised of about 760 shops. The average solid waste at site II was observed to be maximum followed by Site I. The minimum value was exhibited by Site III (Table 1& II and Chart 1).

Table 1: Total Average Solid Waste Kg/Month at Different Study Sites

	SITE I		SITE II		SITE III		TOTAL Av x 12
	AV	SD	AV	SD	AV	SD	
Biodegradable Waste	16941.2	2865.39	20206.5	4558.26	13204.9	4848.89	201410.4
Non- Biodegradable Waste	1394.34	917.143	2092.27	576.901	1075.27	386.78	18247.52
Total	18335.54	2446.76	22298.77	4838.09	14280.17	3834.89	219657.92

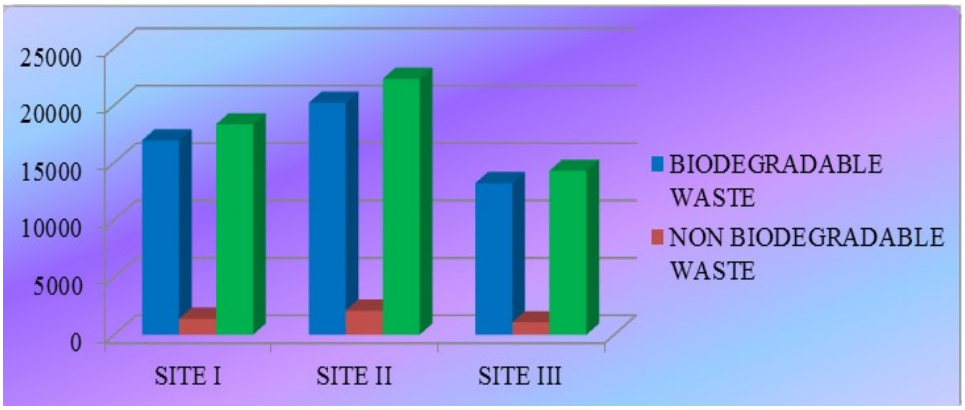

Figure 1: Showing Average Solid Waste Kg/Month at Different Study Sites.

Table 2: Percentage Composition of Biodegradable and Non-Biodegradable Waste

Biodegradable Waste	91.69%
Non-biodegradable Waste	8.31%

The greater percentage of biodegradable waste is due to the presence of greater number of karyana, fruit and vegetable shops in the study area. City of Bhubaneshwar in 2001-2002 also showed the maximum percentage of biodegradable waste (Panda and Mishra, 2003).

Lesser amount of Plastic and polythene waste by weight may be due to various awareness campaigns by government like Swatch Bharat Abhyaan and may be due to the efforts of various NGOs.

It was also revealed that part of solid waste generated at source finds its way to storage bins of collection sites for its disposal by municipal committee of Jammu, but much of solid waste even in the storage bins is not properly disposed of and many dustbin were observed to be overfilled, which attract many stray animals besides providing breeding grounds for flies and germs.

Also in the existing system there was no proper segregation of waste at source of generation. Waste from most of the shops was observed to be thrown in the drains or along roadsides. At some places temporary dumping stations are found. Some part of the waste was found to be separated by rag pickers.

The waste collected from the study area was used to be dumped at Chatham on the banks of River Tawi till 2004 but the dumping site has been shifted to Bhang wait Nagar Jammu, again at the banks of River Twain.

According to Jammu Municipal Committee, approximately 400 tonnes of waste per day is transported to dumping site by municipal vehicles. But, the present practice of collecting and transporting solid waste is totally wastage of time and money. Most of the vehicles are of open type and have less capacity which poses threat to public health and quality of life especially the weaker sections of society.For the disposal, open dump method was followed by Jammu Municipal Committee. The failure to identify a landfill to dump more than 400 tonnes of solid waste generated in Jammu everyday has forced the Jammu Municipal Corporation (JMC) to dump waste in deep trenches created in the forest areas around the city and on the Tawi riverbed, leading to environmental pollution A few years ago a land was identified at KotBhalwal, some 15 km from the city, but locals objected to the project after which the administration decided to abandon the site to establish a dumping ground in Samba.

At the moment the Municipal Corporation collects garbage from 453 collections points within its limits by means of men and machinery and disposes it off into deep trenches on the city outskirts.

Even after 10 years of the initiation of Centrally sponsored multicore project to give cities in Jammu and Kashmir a modern solid waste management system, its completion is nowhere in sight especially in Jammu, winter capital of J&K, which is set to become a health and environmental crisis in the coming years.

An ambitious project commissioning of 27 MLD Sewage Treatment Plant (STP) at Bhagwati Nagar taken up in 2006-07 and plan to identify a dumping site on the outskirts of the winter capital are yet to see the light of the day pushing Jammu at the 251th rank, lowest in India, when it comes to cleanness and ability of the civic bodies to dispose of tonnes of waste generated daily. The construction of the STP, started in 2007 by National Building Construction Corporation (NBCC) Ltd., was supposed to be completed in 2011 along with underground sewerage system, but machinery worth cores of rupees have been left at the mercy of vagaries of weather at Bhagwati Nagar.

It was noted that it did not comply with SWM (M&H) rules, 2000. With the notification of Solid Wastes Management Rules, 2016 under Environment Protection Act, 1986 superseding the erstwhile rules on the subject, duties and responsibilities of Urban local bodies, village Panchayats, waste generators and other related stakeholders have also been fixed and defined.

If every person gets involved, we can have a powerful effect on our environment in a positive way.

CONCLUSIONS

From the study it was concluded that the present method of Solid Waste Management in the area is not suitable. The main management strategies should include amendment of current management laws, improvement in current management system and introduction of classified collection.The solid waste generated in the study area can be utilized in the production of manure and energy which will help to reduce the volume of solid waste and to some extent also reduce the increasing stress on natural resources by meeting the power needs of the people of the area to some extent.

The effective implementation of Solid Wastes Management Rules, 2016 under Environment Protection Act, 1986 will help extensively to solve environmental pollution problems caused by municipal solid waste. As a result of this comprehensive approach, the goal of waste minimisation and sustainable development may finally be achieved.

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